Career breaks in medicine and early-career grants: missing the bus?

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ESCMID MANAGING INFECTIONS PROMOTING SCIENCE

BACKGROUND

Though women increasingly make up the majority of medical school graduates in many countries (1), they are a distinct minority in academic medical settings (2). In Europe and beyond, some level of female talent vanishes from academia at various key stages. The disappearance of that talent, the "leaky pipeline", represents an unacceptable loss for academic research, scientific development, and society as a whole (3). A major factor could be the career breaks that women disproportionately take (4,5). These absences often coincide with the "young investigator" accolades that are typically an important stepping-stone to academic positions. These awards and grants often come with age maximums, and many women will have "aged out" of eligibility upon their return. Alternatively, they may just make the age maximum, but their *curricula vitae* are likely to be substantially thinner at the time of the application: women continue to rank behind men in number and impact of published articles (6) largely because they are more likely to work part-time and take career breaks (5). Thus they will be functionally disadvantaged, as medical funding organizations generally emphasize bibliometric statistics in their applicant evaluations (7). We sought to characterize "young investigator" application restrictions and measures taken, if any, by awarding institutions to provide protections for career breaks.

METHODS

Study design & Inclusion criteria

- An internet-based, 23-question survey, created using www.surveymonkey.com, was sent to all medical societies and funding bodies affiliated with the European Society of Microbiology and Infectious Diseases (ESCMID) offering grants and/or awards.

Exclusion criteria

- Non-medical organizations

Outcomes

- Primary outcome: proportion of medical institutions/ medical funding associations with measures in place for consideration of career breaks when assigning grants and/or awards
- Secondary outcomes: determination of the proportion of women versus men among awardees; general description of current strategies in place to account for career breaks

Statistical analysis

- Categorical data are presented as counts and/or percentages. Comparisons between groups used the chi-square test. Associations with $p<0.05$ (two-sided) were considered statistically significant.

RESULTS

Baseline demographics

- Of the 50 organizations contacted, 14 (28%) responded at least partially and 7 (14%) fully. For two organizations, survey questions could be completed by study investigators, as data were publicly available (Table 1).

Parity commission

- 3/9 (33%) organizations have a formal parity commission and 2/9 (22%) have introduced measures to improve gender balance.

Grants and awards requirements

- 2/9 (22%) reporting organizations impose a fixed age limit (40 years) on applicants of research prizes/ grants (Table 2)
- 5 (55%) organizations require applicants to have recently completed a full-time fellowship (within five years after reaching their highest level of education).
- For one organization (11%), applicants must be working full-time at an academic institution or already have a faculty position at the time of the application.

Applicants & awardees

- Only one organization provided access to acceptance/ rejection data for research grants (Table 3): the Swiss National Science Foundation (SNF) has seen higher acceptance rates for male applicants of research grants for almost all years between 2005 and 2017 ($p < 0.05$).

Career breaks

- Only one organization (11%) has taken measures to account for career breaks; the SNSF allows an extension of the eligibility window of up to one year for sick leave, and 18 months for parental leave.

Table 1-Respondent organizations' baseline characteristics

Organization	Country	Number of members	Grants and awards categories	Applicants, awardees and demographic data publicly available
Federation of European Microbiological Societies	39 European Countries	53 societies	Career development	Yes
Swiss Society for Infectious Diseases	Switzerland	100-999	Research	No
Norwegian Society for Infectious Diseases	Norway	>10'000	Research	No
Australasian Society for Infectious Diseases	Australasia	100-999	Career development	No
Swiss National Science Foundation	Switzerland	No members	Career development & Research	Yes
Society for the Clinical Microbiologists of Turkey	Turkey	1'000-4'999	Career development	No
Italian Society for Infectious Diseases	Italy	100-999	Career development, Research & Preceptorship	Yes
British Society for Antimicrobial Chemotherapy	Great-Britain	100-999	Career development & Research	No
The Society for Healthcare Epidemiology of America	USA	Unknown	Career development & Research	No

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Table 3-Parity commission, grants and awards requirements & career breaks

Organization	Parity Commission	Measures introduced to improve gender balance	Age limit	Other prerequisites	Career break considerations
Federation of European Microbiological Societies	Absence	No	Undisclosed or non-existent	Recently completed fellowship Application within 5 years of getting the highest level of education	Absence
Swiss Society for Infectious Diseases	Absence	No	Undisclosed or non-existent	No prerequisites	Absence
Norwegian Society for Infectious Diseases	Absence	No	Undisclosed or non-existent	Unknown	Absence
Australasian Society for Infectious Diseases	Absence	No	Undisclosed or non-existent	Recently completed fellowship Application within 10 years after getting a PhD Work full-time in an academic institution	Absence
Swiss National Science Foundation	Presence	Yes	Undisclosed or non-existent	Recently completed fellowship Faculty position	Presence
Society for the Clinical Microbiologists of Turkey	Presence	No	40 years old	Unknown	Absence
Italian Society for Infectious Diseases	Presence	Yes	40 years old	No other prerequisites	Absence
British Society for Antimicrobial Chemotherapy	Absence	No	Undisclosed or non-existent	Recently completed fellowship Application within 5 years of getting the highest level of education	Absence
The Society for Healthcare Epidemiology of America	Absence	No	Undisclosed or non-existent	Recently completed fellowship	Absence

DISCUSSION AND CONCLUSION

Most reporting organizations impose age restrictions, either fixed or functional, on applicants of career-development awards, without adjustment for career breaks. Consensus recommendations are needed to avoid the exclusion of those who take temporary absences for familial obligations.

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Table 2-Success rates of female and male applicants of the Swiss National Science Foundation's research grants and prizes (data publicly available; p values calculated by Chi square).

Year	Female applicants	Female awardees	Female success rate (%)	Male applicants	Male awardees	Male success rate (%)	p	OR (95% CI)
2005	263	138	52.47	1494	926	61.98	.004	1.5 (1.12-1.93)
2006	333	183	54.95	1'419	965	68.01	.000	1.7 (1.36-2.24)
2007	328	174	53.05	1'496	990	66.18	.000	1.7 (1.35-2.22)
2008	373	208	55.76	1'493	1018	68.18	.000	1.7 (1.34-2.16)
2009	380	173	45.53	1'521	909	59.76	.000	1.8 (1.41-2.24)
2010	431	200	46.40	1'841	979	53.18	.012	1.3 (1.06-1.63)
2011	505	208	41.19	1'901	1015	53.39	.000	1.6 (1.33-2.00)
2012	444	205	46.17	1'776	1000	56.31	.000	1.5 (1.21-1.86)
2013	496	229	46.17	1'760	978	55.57	.000	1.5 (1.19-1.79)
2014	494	221	44.74	1'754	943	53.76	.000	1.4 (1.17-1.76)
2015	546	234	42.86	1'939	882	45.49	.284	1.1 (0.91-1.35)
2016	501	191	38.12	1'884	817	43.37	.037	1.2 (1.01-1.53)
2017	454	199	43.83	1'437	709	49.34	.041	1.2 (1.01-1.53)